

REMARKS

After the foregoing Amendment, Claims 1-5, 8, 12-16, 19, and 32-39 are currently pending in this application. Claims 6-11, 17-31, and 37 have been canceled without prejudice. Claims 1, 8, 12, 19, and 37 have been amended, and new claims 38 and 39 have been added to more clearly distinguish subject matter which the Applicant regards as the invention. Applicant submits that no new matter has been introduced into the application by these amendments.

New Matter Objection - 35 U.S.C. § 132(a)

The Examiner objected to the Amendment filed January 13, 2006 under 35 U.S.C. §132(a) as introducing new matter into the disclosure. Specifically, the Examiner indicated claims 8, 19, and 37 contained new matter. While the Applicant disagrees, claims 8, 19, and 37 are canceled without prejudice pursuant to the foregoing amendment.

Claim Rejections - 35 U.S.C. §103

Claims 1-3, 6-14, 17-25, and 28-31 stand rejected under 35 U.S.C. §103(a) as being unpatentable over admitted prior art of Applicant in view of U.S. Patent Publication No. 2003/0017835, to Bergel (hereafter Bergel). The Applicant respectfully disagrees.

The present invention is a method for improved channel quality indication in a dynamic link adapted wireless communication system. As claimed in claim 1, a receiver receives a downlink data communication on a downlink data channel, performs at least one current quality measurement, and based upon the at least one current quality measurement a predictive CQI is derived that estimates the future quality of the downlink data channel. The predictive CQI contains signal quality metrics, such as a signal to interference ratio (SIR). The predictive CQI is then used in determining appropriate future transmission parameters. In this manner, the claimed invention provides a method for improving future transmission quality.

In contrast to the present invention, Bergel teaches the use of a common pilot

symbol to estimate and predict channel quality in a communication system having a diverse antenna base station, (see flow diagram Figures 4A, 4B, and 5). Unlike the present invention which may be implemented using a single antenna, Bergel requires a diverse multiple antenna system. More specifically, Bergel discloses the following:

The base station transceiver 12 comprises a plurality of adaptive antennas 30 including the first antenna 30(1) and a second antenna 30(m) to direct both the first transmission signal 32A and the second transmission signal 32B to the antenna 26. (See paragraph 0020, emphasis added.)

Bergel further teaches that the mobile receiver receives and processes the common pilot channel to make a determination as to whether to interact with the base station transceiver. Next, future channel prediction information concerning the two transmission signals is transmitted back to the base station via a feedback channel. This information is then used to select weighted values for the two active antennas so that the base station implements the best possible antenna array.

To further distinguish Bergel from the present invention, Bergel fails to disclose the transmission of CQI parameters derived by a receiver and signaled to a transmitter to provide future channel prediction. In the present invention, the CQI parameters provide either specific link adaptation information, such as a recommended coding and modulation scheme for adaptive modulation and coding, or provide one or more general quality indicators, excluding power measurements, to select appropriate parameters for future transmissions.

Unlike the present invention, Bergel relies solely on multiplying antenna inputs with a selected weighted power value to predict the transmission of a future channel. More specifically, Bergel discloses the following:

Using the channel prediction and feedback calculation algorithms, in

one embodiment, a selection of a particular antenna weight value may enable an accurate matching of a future state of transmission to a future channel state.

Antenna inputs of each participating antenna of the plurality of adaptive antennas 30 (Fig. 1) may be multiplied with the selected weighted value to predict the transmission of a future channel as indicated in block 185. (See paragraphs 0029 and 0052, emphasis added.)

Based on channel estimation operations of the pilot channel transmitted by the diverse antenna array, Bergel teaches predicting the future channel states that may develop between the base station and mobile station. Accordingly, a slowly moving mobile station can reduce multipath fading by providing an indication of the predicted power of the received signal. Using the common pilot channel signals from the base station's diverse antenna array, Bergel discloses the prediction of channel states. Bergel only teaches utilizing the diverse transmission of a common pilot channel from an antenna array to measure signal transmission power and to perform channel estimation; Bergel does not teach or remotely suggest using quality measurements of a data channel to derive a predictive CQI, as claimed in independent claims 1, 12, and 32. Bergel discloses the following:

Prediction of a future state of a channel from common pilot channel signals transmitted from a transceiver may be formed at a mobile user equipment to control future transmission patterns of the transceiver at a specified time.

Upon receipt of the first and second common pilot channel signals, the processor 20 using the channel controller application 24 processes the first transmission signal 32A and/or the second transmission signal 32B. The channel controller application 24 generates the future prediction information.... (See abstract and paragraph 0025, emphasis added.)

The admitted prior art in the present application points out that prior art

techniques are inadequate because they fail to provide current or future channel quality indications, and are limited to providing old, or stale, channel quality indications. This is disadvantageous because non-current determinations of the channel conditions generally do not accurately reflect the current channel conditions. This inaccuracy in estimated channel conditions leads to reduced throughput, wastes transmit power, and increases interference with other cells. Obtaining a current, accurate assessment of the channel conditions by utilizing the method claimed in independent claims 1, 12, and 32 for predicting future channel conditions is therefore advantageous.

The Applicant submits that the amended claims are not obvious over the admitted prior art in view of Bergel, and respectfully requests withdrawal of this §103(a) rejection.

The Examiner rejected claims 4, 15, and 35 under 35 U.S.C. § 103(a) as being unpatentable over admitted prior art of applicant and Bergel, and further in view of U.S. Patent Publication No. 2003/0129992 to Koorapaty et al. (hereafter Koorapaty). Claims 4, 15, and 35 depend from claims 1, 12, and 32 respectively, which for the reasons presented above are not obvious over the admitted prior art in view of Bergel. Applicant respectfully requests reconsideration of these claims and withdrawal of the rejection under § 103(a).

The Examiner rejected claims 5, 16, and 36 under 35 U.S.C. § 103(a) as being unpatentable over admitted prior art of applicant and Bergel, and further in view of U.S. Patent No. 5,305,468 to Bruckert et al. (hereafter Bruckert). Claims 5, 16, and 36 depend from claims 1, 12, and 32, respectively, which for the reasons presented above are not obvious over the admitted prior art in view of Bergel. Applicant respectfully requests reconsideration of these claims and withdrawal of the rejection under § 103(a).

Applicant: Philip J. Pietraski
Application No.: 10/698,721


Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendments and remarks, Applicant respectfully submit that the present application, including claims 1-6, 8, 12-16, 19, and 32-39 is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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